

**ABSTRACT**

Methods and materials are provided for the production and purification of halogenated compounds and intermediates in the production of 1,1,1,3,3-pentafluoropropane. In a preferred embodiment, the process steps include: (1) reacting carbon tetrachloride with vinyl chloride to produce 1,1,1,3,3-pentachloropropane; (2) dehydrochlorinating the 1,1,1,3,3-pentachloropropane with a Lewis acid catalyst to produce 1,1,3,3-tetrachloropropene; (3) fluorinating the 1,1,3,3-tetrachloropropene to produce 1-chloro-3,3,3-trifluoropropene; (4) fluorinating the 1-chloro-3,3,3-trifluoropropene to produce a product mixture containing 1,1,1,3,3-pentafluoropropane; and (5) separating 1,1,1,3,3-pentafluoropropane from by-products.